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THE SCIENTIFIC MEETING AT CAMBRIDGE.

From the accounts given in this journal of the meetings of the British Association at Glasgow and at York, our readers are aware that we regard that body and its proceedings in a favourable light. It has always appeared to us that a good end is served when men can be brought into personal association for the promotion of common objects and the enjoyment of common pleasures, as such meetings are usually found to insure harmony where otherwise there might be hostility, or at least indifference, and much can, of course, be done by combination, where single efforts would be useless. The British Association is also serviceable in awakening and stimulating efforts in behalf of science in the special districts where it meets, and in introducing local objects of scientific and general interest to the notice of many persons who otherwise would remain ignorant of them. It affords, likewise, a brief period of pleasant excitement and recreation to multitudes of studious persons greatly in need of relief from the monotony of their ordinary toils: even on this inferior ground, it could be defended from the ridicule with which certain members of the public press are pleased to assail what assuredly does no harm to any one, whatever may be the amount of positive good which it effects.

The meeting of the present year (June 18—25) took place at Cambridge, where it had assembled for its third session (1833). It was allowed to be a good meeting in point of attendance (between a thousand and eleven hundred members), and there never had been any at which so many distinguished foreign savants were present. In one point of great importance, though of little popular interest, namely, the meteorological observations, it stands above all former meetings. Apart from this, it was not scientifically very brilliant, though it presented several salient points of considerable interest. One external circumstance added much to the enjoyment of all concerned, that the meeting was favoured throughout with the most beautiful weather.

On arriving in Cambridge on the evening of the 18th, we found, as usual, all bustle and excitement at the reception-room, which on this occasion was in the town-hall. Many members being accommodated in the colleges, we experienced little difficulty in procuring an agreeable lodging; which important preliminary being settled, we sauntered forth to enjoy an evening walk amidst the august shades of those piles of past centuries in which English learning is sheltered—a scene always striking to a Scotchman, as being so different from anything of an analogous nature in his own country. And verily, as we saw the lofty spires of King's College chapel and of Trinity piercing the blue of a June night, and tipped with its palely stars, we could have fancied ourselves transported into a scene realised out of eastern fable. We bethought us of the power of even external beauty in protecting the institutions here established. The most daring innovator might come hither full of eagerness to meddle with systems unquestionably representative rather of past centuries than the present, and we can conceive him so captivated through the agency of the mere æsthetics of the place, that, like Alaric awed by the venerableness of the Roman senate, into which he had intruded, our innovator would shrink from his task, and leave the business of reform to ruder hands.

A sunbright morning saw the members hurrying to the various sectional meetings, according to their various predilections. The first section of which we shall speak—the Geological—we found accommodated in the senate-house, a beautiful Grecian building of about the time of Queen Anne, finely decorated within with carved wood-work, and having a platform with rising seats at the upper end, surmounted by a canopy under which the existing royalty of England had recently sat. This was by far the largest and best room enjoyed by any of the sections, and it was assigned to the geological because the meetings of that body are generally the most numerously attended. It may be mentioned parenthetically, that the geological is also the section usually most frequented by the ladies; indeed it is almost the only section which enjoys any share of feminine patronage. On the present occasion, we found a brilliant assemblage of both sexes seated on benches across the room, while Professor Sedgwick, Dr Buckland, Mr Murchison, Sir Henry de la Beche, and other chiefs of geological science, were mustering on the platform. Mr Sedgwick soon after assumed the presidency of the section, and proceeded, as an appropriate commencement of business, to give an exposition of the geology of the immediate neighbourhood of Cambridge. During this and subsequent days, the geological section maintained its character, as one which mingles more pleasantries with science than any of the rest. The fact is, that its leaders are men of lively and varied talents, who, being on the most friendly footing with each other, cannot meet even before a large miscellaneous audience without indulging in their customary familiarity of discourse. There was, therefore, hardly a paper read, or an exposition made, that was not followed by a conversation in which sober and instructive remarks were relieved by facetiæ more or less generally appreciable. The quick vivacious movements of Professor Sedgwick, whose ideas flow too rapidly even for an unusually rapid discourse, contrasted delightfully with the measured oratorical tone and grave demeanour in which the jocundities of Dr Buckland were enunciated. The audience on these occasions seemed to feel that it added much to the enjoyment of the knowledge imparted, that its authors should thus be able to come down, not inde-

corously, to the level of the unlearned. And here we may remark, that, at one of the general evening meetings, when the beautiful electro-magnetic machine of Mr Armstrong of Newcastle was exhibited, several of the physicists, as Sir David Brewster and Mr Faraday, joined heartily in the amusement occasioned by the shocks which were circulated amongst the ladies and gentlemen present. At one time, we observed a long loop of people with joined hands, extending through the multitude in the senate-house, somewhat like a party standing up for a country dance: several philosophers were of the number. When the engine was put in motion, the whole of these persons might have been seen in a kind of dance at one moment, from the effects of the electricity. Two minutes after, Mr Faraday was on the platform, expounding the nature of the agent that had excited them all so much, in language that introduced awe and deep feeling where recently nothing but merriment had been.

Of the other sections, two were on this occasion hardly existent, namely, the Medical and Mechanical. The rest were active, and to make up in some degree for the failure of these, there was a sub-section for the new science of Ethnology (the characters of nations), which abounded in valuable papers. Hereafter, the Medical is to appear under the title of the Physiological, so as to embrace a wider range of subjects. We now propose to present notices of a few of the most generally interesting matters brought before the various sections.

MR BONOMI ON CERTAIN GIGANTIC BIRDS OF FORMER TIMES.

The existence of slabs of the new red sandstone of America marked with footsteps of large birds apparently of the stork species, is well known. As some of these animals are calculated to have been fifteen feet high, they were at first supposed to have no parallel in the present state of nature; but this was soon found to be not the case, as several specimens of the bones of a bird not less gigantic have since been sent home from New Zealand, where it is spoken of by the natives as recently existing under the name of Moa. There have also been discovered by Captain Flinders, on the south coast of New Holland, in King George's Bay, some very large nests, measuring twenty-six feet in circumference and thirty-two inches in height; resembling, in dimensions, some that are described by Captain Cook, as seen by him on the north-east coast of the same island, about 15 degrees south latitude. It would appear, by some communications made to the editor of the Athenæum, that Professor Hitchcock of Massachusetts had suggested that these colossal nests belonged to the Moa. In connection with these discoveries is another from an opposite quarter. 'Between the years 1821 and 1823, Mr James Burton discovered on the west coast, or Egyptian side of the Red Sea, opposite the peninsula of Mount Sinai, at a place called Gebel Ezzeit, where, for a considerable distance, the margin of the sea is inaccessible from the Desert, three colossal nests within the space of one mile. These nests were not in an equal state of preservation; but, from one more perfect than the others, he judged them to be about fifteen feet in height, or, as he observed, the height of a camel and its rider. These nests were composed of a mass of heterogeneous materials, piled up in the form of a cone, and sufficiently well put together to insure adequate solidity. The diameter of the cone at its base was estimated as nearly equal to its height, and the apex, which terminated in a slight concavity, measured about two feet six inches or three feet in diameter. The materials of which the great mass was composed were sticks and weeds, fragments of wreck, and the bones of fishes; but in one was found the thorax of a man, a silver watch made by George Prior, a London watchmaker of the last century, celebrated throughout the East, and in the nest or basin at the apex of the cone, some pieces of woollen cloth and an old shoe. That these nests had been but recently constructed, was sufficiently evident from the shoe and watch of the shipwrecked pilgrim, whose tattered clothes and whitened bones were found at no great distance; but of what genus or species had been the architect and occupant of the structure, Mr Burton could not, from his own observation, determine. From the accounts of the Arabs, however, it was presumed that these nests had been occupied by remarkably large birds of the stork kind, which had deserted the coast but a short time previous to Mr Burton's visit. To these facts,' said Mr Bonomi, 'I beg to add the following remarks:—Among the most ancient records of the primeval civilisation of the human race that have come down to us, there is described, in the language the most universally intelligible, a gigantic stork bearing, with respect to a man of ordinary dimensions, the proportions exhibited in the drawing before you, which is faithfully copied from the original document. It is a bird of white plumage, straight and large beak, long feathers in the tail; the male bird has a tuft at the back of the head, and another at the breast; its habits apparently gregarious. This very remarkable painted basso-relievo is sculptured on the wall, in the tomb of an officer of the household of Pharaoh Shufu (the Suphis of the Greeks), a monarch of the fourth dynasty, who reigned over Egypt while yet a great part of the Delta was intersected by lakes overgrown with the papyrus—while yet the smaller ramifications of the parent stream were inhabited by the crocodile and hippopotamus—while yet, as it would seem, that favoured land had not been visited by calamity, nor the arts of peace disturbed by war; so the sculpture in these tombs intimate, for there is neither horse nor instrument of war in any one of these tombs. At that period, the period of the building of the Great Pyramid, which, according to some writers on Egyptian matters, was in the year 2100 B.C., which, on good authority, is the 240th year of the deluge, this gigantic stork was an inhabitant of the Delta, or its immediate vicinity; for, as these very interesting documents relate, it was occasionally entrapped by the peasantry of the Delta, and brought with other wild animals, as matters of curiosity, to the great landholders or farmers of the products of the Nile—of which circumstance this painted sculpture is a representation, the catching of fish and birds, which in these days occupied a large portion of the inhabitants. The birds and fish were salted. That this document gives no exaggerated account of the bird, may be presumed from the just proportion that the quadrupeds, in the same picture, bear to the men who are leading them; and, from the absence of any representation of these birds in the less ancient monuments of Egypt, it may also be reasonably conjectured they disappeared soon after the period of the erection of these tombs. With respect to the relation these facts bear to each other, I beg to remark, that the colossal nests of Captains Cook and Flinders, and also those of Mr James Burton, were all on the sea-shore, and all of those about an equal distance from the equator. But whether the Egyptian birds, as described in those very ancient sculptures, bear any analogy to those recorded in the pages of the great stone book of nature (the new red sandstone formation), or whether they bear analogy to any of the species determined by Professor Owen from the New Zealand fossils, I am not qualified to say, nor is it indeed the object of this paper to discuss; the intention of which being rather to bring together these facts, and to associate them with that recorded at Gezah, in order to call the attention of those who have opportunity of making further research into this interesting matter.'*

DISTRIBUTION OF PLANTS.

Professor Edward Forbes, of King's College, excited great interest in the Natural History section by a curious speculative paper respecting the distribution of plants. He started with the proposition, that, admit-

* Athenæum Report.

ting or assuming the theory, that there have been several distinct centres of creation for plants (the idea now paramount amongst naturalists), the isolation or separation of assemblages of individual plants from their centres, and the existence of *endemic* or very local plants, are not satisfactorily accounted for by the agency of the sea, rivers, and winds, and carriage by animals, or through the agency of man. 'It is usual to say' (here we quote from Mr Forbes's abstract*), 'that the presence of many plants is determined by soil or climate, as the case may be; but if such plants be found in areas disconnected from their centres by considerable intervals, some other cause than the mere influence of soil or climate must be sought to account for their presence. This cause the author proposes to seek in an ancient connexion of the outposts or isolated areas with the original centres, and the subsequent isolation of the former through geological changes and events, especially those dependent on the elevation and depression of land. Selecting the flora of the British islands for a first illustration of this view, Professor Forbes calls attention to the fact, well known to botanists, of certain species of flowering plants being found indigenous in portions of that area at a great distance from the nearest assemblages of individuals of the same species in countries beyond it. Thus many plants peculiar in the British flora to the west of Ireland, have the nearest portion of their specific centres in the north-west of Spain; others confined with us to the south-west promontory of England, are, beyond our shores, found in the Channel Isles and the opposite coast of France; the vegetation of the south-east of England is that of the opposite part of the continent; and the Alpine vegetation of Wales and the Scotch Highlands is intimately related to that of the Norwegian Alps. The great mass of the British flora has its most intimate relations with that of Germany. The vegetation of the British islands may be said to be composed of five floras:—1st, A west Pyrenean, confined to the west of Ireland, and mostly to the mountains of that district; 2d, A flora related to that of the south-west of France, extending from the Channel Isles, across Devon and Cornwall, to the south-east and part of the south-west of Ireland; 3d, A flora common to the north of France and south-east of England, and especially developed in the chalk districts; 4th, An Alpine flora, developed in the mountains of Wales, north of England, and Scotland; and, 5th, A Germanic flora, extending over the greater part of Great Britain and Ireland, mingling with the other floras, and diminishing, though slightly, as we proceed westwards, indicating its easterly origin and relation to the characteristic flora of northern Germany. Interspersed among the members of the last-named flora, are very few specific centres peculiar to the British isles. The author numbers in ascending order these floras, according to their magnitude as to species, and also, in his opinion, according to their relative age and period of introduction into the area of the British islands. His conclusions on this point are the following:—

'1. The oldest of the floras now composing the vegetation of the British isles is that of the mountains of the west of Ireland. Though an Alpine flora, it is southernmost in character, and is quite distinct as a system from the floras of the Scottish and Welsh Alps. Its very southern character, its limitation, and its extreme isolation, are evidences of its antiquity, pointing to a period when a great mountain barrier extended across the Atlantic from Ireland to Spain.

'2. The distribution of the second flora, next in point of probable date, depended on the extension of a barrier, the traces of which still remain, from the west of France to the south-east of Britain, and thence to Ireland.

'3. The distribution of the third flora depended on the connexion of the coast of France and England towards the eastern part of the Channel. Of the former existence of this union no geologist doubts.

'4. The distribution of the fourth, or Alpine flora of Scotland and Wales, was effected during the glacial period, when the mountain summits of Britain were low islands, or members of chains of islands, extending to the area of Norway through a glacial sea, and clothed with an arctic vegetation, which, in the gradual upheaval of those islands, and consequent change of climate, became limited to the summits of the new-formed and still-existing mountains.

'5. The distribution of the fifth, or Germanic flora, depended on the upheaval of the bed of the glacial sea, and the consequent connexion of Ireland with England, and of England with Germany, by great plains, the fragments of which still exist, and upon which lived the great elk and other quadrupeds now extinct.

'The breaking up or submergence of the first barrier led to the destruction of the second; that of the second to that of the third; but the well-marked epoch of migration of the Germanic flora indicates the subsequent formation of the Straits of Dover and of the Irish Sea, as now existing.

'To determine the probable geological epoch of the first or west Irish flora—a fragment perhaps with that of north-western Spain, of a vegetation of the true Atlantic—we must seek among fossil plants for a furthermost starting point. This we get in the flora of the London clay, or eocene, which is tropical in character, and far anterior to the oldest of the existing floras. The geographical relations of the miocene sea, indicated by the fossils of the crag, give an after-date certainly to the second and third of the above floras, if not to the first. The epoch of the red or middle crag was probably coeval with the second flora; that of the mammaliferous crag with the third. The date of the fourth is too evident to be questioned; and the author regards the glacial region in which it flourished as a local climate, of which no true traces, as far as animal life is concerned, exist southwards of his second and third barriers. This was the newer pliocene epoch. The period of the fifth flora was that of the post-tertiary, when the present aspect of things was organised.

'Adopting such a view of the relations of these floras in time, the greatest difficulties in the way of changes of the earth's surface and destruction of barriers—deep sea being found where land (probably high land) was—are removed, when we find that those greater changes must have happened during the epoch immediately subsequent to the miocene period; for we have undoubted evidence that elsewhere, during that epoch, the miocene sea-bed was raised 6000 feet in the chain of Taurus, and the barriers forming the westward boundary of the Asiatic eocene lakes so completely annihilated, that a sea several hundred fathoms deep now takes their probable place. The changes required for the events which the author would connect with the peculiar distribution of the British flora, are not greater than these.

'Professor Forbes maintains that the peculiar distribution of endemic animals, especially that of the terrestrial mollusca, bears him out in these views. He proposes to pursue the subject in detail, with reference both to animal and vegetable life, in connexion with the researches of the geological survey.'

* Literary Gazette, June 28.

EXPERIMENTS OF PROFESSOR BOUTIGNY—FREEZING OF WATER IN RED-HOT VESSELS.

No subject before the Association excited more popular interest than certain experiments performed in the Chemical section by Professor Boutigny. The room of assembly being small, it was impossible that one-half of those desirous of witnessing the experiments could be admitted. They were repeated, and yet, on the second occasion, many, amongst whom were ourselves, went away ungratified. The exposition of M. Boutigny, which was in French, referred to the 'spheroidal state of bodies, and the application of this knowledge to steam-boilers.' As is well known from every-day experience, when drops of water are thrown upon red-hot

iron, they assume a spherical form. It is not so well known that the drops, in these circumstances, remain at a minute distance apart from the iron, and that the heat of the plate is not communicated to them. M. Boutigny showed on this occasion a red-hot platinum cup, with a small quantity of water dancing about in it like a globe of glass, without boiling. When the metal, however, cools down to a certain point, the water comes in contact with it, heat is communicated, boiling takes place, and the water quickly evaporates. The same result is observed when any substance capable of assuming a globular form is placed on a heated surface; in proof of which the professor placed in the heated cup of platinum, iodine, ammonia, and some inflammable fluid, each of which became globular, and danced about like the globule of water, but without emitting vapour or smell, or being inflamed, till the platinum was cooled. M. Boutigny also heated a silver weight, of the same shape as the weight of a clock, until it was red-hot, and then lowered it by a wire into a glass of cold water, without there being the slightest indication of action in the water, more than if the weight had been quite cold. The experimentalist advanced no theory to account for these peculiar actions, further than that a film of vapour intervenes between the heated body and the substance, which prevents the communication of heat. The facts, however, he thought were of importance in a practical point of view, both in the tempering of metals and in the explanation of the causes of steam-boiler explosions. From these experiments, it would appear that, in tempering metals, if the metal be too much heated, the effect of plunging it into water will be diminished. In steam-boilers also, if the water be introduced into a heated surface, the heat may not be communicated to the water, and the boiler may become red-hot, and without any great emission of steam; until at length, when the boiler cools, a vast quantity of steam may be generated, and the boiler burst. The last and most curious experiment performed by M. Boutigny was the freezing of water in a red-hot vessel. It has been thus described in the Literary Gazette's report:—'If any substance boils below the freezing point of water, that same substance would be below its own boiling point; and therefore water in contact would be frozen. Sulphurous acid is such a substance; and consequently, sulphurous acid in an incandescent crucible in the spheroidal shape is itself colder than ice: in addition, however, to its own coldness, it evaporates when touched by the water; therefore intense cold is produced, and the water instantly freezes.' The sight of water put into a red-hot crucible, and almost instantly turned out upon the experimenter's hand a mass of ice, elicited loud and continued applause.

MODIFICATIONS OF SHELLS IN SUCCESSIVE STRATA IN THE ISLAND OF COS.

Professor Edward Forbes made a joint communication for himself and Captain Sprat, R.N., on a remarkable phenomenon connected with certain fresh-water tertiary strata in the island of Cos. In a diagram exhibited, three such strata, marked A, B, and C, in ascending succession, lay against a mass of scaglia, and were unconformably surmounted with a marine formation. In stratum A, there were shells of well-known species of fresh-water mollusca, especially paludina and nereitina: as usual, their convolutions were devoid of ribbings or humps. But in stratum B, the same shells were found with a hump on each convolution; and in stratum C, the same shells had three humps. There were here appearances of either a transmutation of species, or a creation of new species, neither of which propositions he was willing to admit. He had therefore suppressed the surprise he felt at the phenomenon for upwards of two years, until at length a better explanation had occurred to him. It had been ascertained, that when fresh-water molluscs were put into brackish water, their shells in time experienced a distortion, provided that the species could survive and propagate in such circumstances. He was therefore of opinion that an intrusion of the sea had taken place in the fresh-water lake in which stratum B was formed, and that this had been attended by the destruction of several of the weaker-lunged species which appear in A, and the distortion of the shells of the stronger-lunged (pectenibranchiate) which remained. In stratum C, more salt water had come in, and increased the deformities, as described. There was thus a modification of forms, but not a change of species. At the conclusion of this paper, which was listened to with great interest, Mr Lyell and other gentlemen present stated other instances of a change of figure experienced by fresh-water molluscs which had been exposed to the influence of salt water. It has the effect of dwarfing and distorting them.

DR BUCKLAND ON THE AGENCY OF LAND SNAILS IN FORMING HOLES AND TRACKWAYS IN COMPACT LIMESTONE.

The learned doctor here made further observations on a subject which he had brought before the Association four years ago, and which, he complained, had then and since been treated with much scepticism. He had found limestone at various places (Tenby, Boulogne, Plymouth) presenting surfaces downwards, and in these surfaces there were holes in which land snails were sheltered. In some instances, these holes were several inches deep, and in a few, two or three met together in the interior of the stone. Dr Buckland said he had found these marked surfaces invariably in the neighbourhood of pastures where snails were numerous; and so certain was their appearance in certain circumstances, that oftener than once he had, in travelling, pointed to a rock as one that would be found marked, and it had proved to be so. He exhibited specimens of limestone from several localities, showing perforations still containing the shells of snails, or furrows leading to the perforations, and he insisted that these were unlike any that are produced by other causes. The fact of their always being on the under surfaces of ledges, and thus presented downwards, proved that they were independent of atmospheric causes. He did not mean that the snails required holes for their residence; but he maintained that the perforations were a result of their sheltering there, and acid exuding from their skin being the agent which wore down the stone. Dr Buckland had even made some approach to an ascertainment of the rate at which the stone becomes perforated. He had found the lower faces of the ledges in the wall of Richborough castle marked in this manner to the depth of about an inch and a half. Richborough was a work of the Romans, who had left it fourteen hundred years ago. Assuming that the snails commenced operations at that time, it appeared that they wrought their way into the stone at the rate of an inch in a thousand years.

The reading of this paper excited some merriment; but the view taken by Dr Buckland of the operation of the snails was generally acceded to; and its being one of no unimportant character in science, is shown by its demolishing an inference which had been drawn from certain perforated rocks, as evidence of a raised beach. It is now seen, that what a former inquirer deemed to have been effected by the wearing action of the sea, was the work of a few humble land snails.

Besides the meetings at the seven sections, there were general assemblages in the evening at the senate-house: the first, on Thursday evening, was devoted to the business of installing the president elect, Sir John Herschel. The Dean of Ely (Dr Peacock), the president of the past year, introduced his successor in terms which were almost affecting, from the allusion they contained to the two men having been competitors thirty-two years before for college honours. Sir John, on taking the chair, replied with like feeling, and read an address embracing a variety of philosophical subjects. It was painful to find that this eminent person, while possessing the usual appearances of health, has

lost the power of making himself heard at any considerable distance. His address has, however, been published, and we extract from it a passage regarding that which has chiefly distinguished the meeting of this year—the congress of meteorologists. Of these, he mentioned as present M. Kupffer, the Director-General of the Russian System of Magnetic and Meteorological Observation; M. Ermann, the celebrated circumnavigator and meteorologist; Baron Von Seftenborg; M. Kreil, Director of the Imperial Observatory at Prague; M. Boguslawski, Director of the Royal Prussian Observatory at Breslau—all of whom had come on purpose to afford to the meeting the benefit of their advice and experience. 'Every member,' said Sir John, 'is aware of the great exertions which have been made during the last five years, on the part of the British, Russian, and several other foreign governments, and of our own East India Company, to furnish data on the most extensive and systematic scale, for elucidating the great problems of terrestrial magnetism and meteorology, by the establishment of a system of observatories all over the world, in which the phenomena are registered at instants strictly simultaneous, and at intervals of two hours throughout both day and night. With the particulars of these national institutions, and of the multitude of local and private ones of a similar nature both in Europe, Asia, and America, working on the same concerted plan, so far as the means at their disposal enable them, I need not detain you: neither need I enter into any detailed explanation of the system of magnetic surveys, both by sea and land, which have been executed, or are in progress, in connexion with, and based upon, the observations carried on at the fixed stations. These things form the subject of special annual reports, which the committee appointed for the purpose have laid before us at our several meetings, ever since the commencement of the undertaking; and the most recent of which will be read in the Physical section of the present meeting, in its regular course. It is sufficient for me to observe, that the result has been the accumulation of an *enormous* mass of most valuable observations, which are now, and have been for some time, in the course of publication; and when thoroughly digested and discussed, as they are sure to be, by the talent and industry of magnetists and meteorologists, both in this country and abroad, cannot fail to place those sciences very far indeed in advance of their actual state.'

The general meeting of Friday evening was distinguished by a singularly able and lucid popular exposition of the subject of the earth's magnetism by the astronomer-royal, Professor Airey. On Saturday evening there was a promenade, which excited little interest. On Monday, Mr Murchison treated the members with a discourse on the geology of Russia, which subject he has been engaged in investigating for five years, and on which he is about to publish an elaborate work. It appears that the various formations of that vast region present mainly the same records of animal life as the corresponding strata in England, thus adding to the evidence that these formations are chronicles of the advance of life from mean to exalted forms during certain definite eras of the earth's existence. The surfaces covered by single formations in Russia, are in some instances as large as the whole of England. Mr Murchison also showed that there formerly existed in Russia a huge Mediterranean sea, whose boundaries were from the Volga to the sea of Azof, the Caspian extending to an immense distance, even to Chinese Tartary.

On the evening of Tuesday there was another promenade, which was enlivened by the exhibition of Mr Armstrong's magnetico-electric machine. The last evening meeting, on Wednesday, was devoted to general business, and brought from the chiefs of the Association several eloquent speeches. It was now announced that the next meeting should take place in Southampton in the month of September 1846, under the presidency of Mr Murchison.

The Association, during the week of the meeting, had the privilege of entrée to the observatory, a little way out of town, to the college halls, chapels, libraries, and museums, and to a model-room where a few curious objects had been collected. Amongst these we were most struck by a series of preparations in the anatomy of the invertebrate animals, the work of Mr Goadby. This gentleman has devoted an ingenious and indefatigable mind for five-and-twenty years to such preparations, and he has now attained a degree of dexterity in the work, which leaves everything of the kind at an immeasurable distance. First, dismissing the cylindrical bottles, as distorting all objects placed in them, he adopts cubical glass cases, formed of soldered plates, through which each feature is seen in its exact proportions. Second, he presents animals in various appearances: one case, for instance, will give the alimentary system; another the nervous; and so on. He even studies by what colour of paper, as a background, he can best bring out the lineaments of the objects. These preparations were universally admired; and the preparer excited much amusement when he took out a brooch containing a beetle so perfectly preserved in spirits, that not a shade of colour on its wings was tarnished.

The hospitalities of the colleges on this occasion were of a moderate kind, and there was little of that mutual flattery in which such bodies are apt to indulge on social occasions. We would still remark, that, to persons like ourselves, of whom there must be many, who come for the love of science alone, and enjoy but little acquaintance with its cultivators, there sometimes appears a slight offensiveness in a certain tone of over-good fellowship which frequently bursts out amongst the leaders of the Association in public. There is something provoking in it to the uninitiated. Turning to a graver matter, we cannot but sympathise a little in the disappointment so often felt by the public with regard to the matters brought forward at the Association. There are many valuable isolated facts, but there never is such a thing as a comprehensive view of nature in any of her departments. At the beginning of the Royal Society, men were bringing forward observations on particular matters: they are doing the same at this day, though six generations have meanwhile gone to dust. Common minds see no sense in this wasting of life in the establishment of new species of moths and ascertainment of new laws presiding over the heating of bodies. They call for something either offering great practical advantages, or opening up new and better views of the relation in which we stand to the great agencies external to ourselves. It is all very well to decry rash generalisation; but while science professes to show merely a collection of bricks towards the building of a house, it will never get any credit as an architect, and the popular apprehension of the value of its researches will be dubious and obscure.

ASCENT OF MAUNA LOA.

Of the thousands whom description has rendered familiar with Ætna, Vesuvius, and Hecla, few may have even heard of the equally imposing phenomena that present themselves to the navigator of the Pacific. Among the fiery cones and simmering craters of Polynesia, those of Hawaii, one of the Sandwich islands, are by far the most gigantic—their elevation being such as to retain a perpetual cap of snow, though situated directly under the tropics. Hawaii, so memorable for the murder of Captain Cook, is of an irregular form, fully 260 miles in circumference, and from shore to shore entirely of volcanic origin. So extremely irregular is its surface, that not a square mile of level ground is to be found; in fact, it may be said to be one vast mountain, or rather congeries of mountains, having a common base, and heaving their cones to the height of thirteen, fourteen, and sixteen thousand feet above the level of the sea. The three most remarkable prominences are Mauna Kea, Mauna Loa, and Mauna Hualalai, that of Loa being still in active combus-

tion, and vomiting forth floods of lava from various points of its surface. This mountain is described as a vast dome, sixty miles in diameter, and nearly three miles in height, having a shoulder or terrace on its eastern slope, in which is situated the active crater of Kilauea, unsurpassed for grandeur and magnitude by any similar phenomena. It is thus that Mauna Loa has been an object of the greatest interest to navigators ever since the discovery of these islands, and that we have had accounts of the partial or complete ascents by Byron, David Douglas the botanist, Dr Gardner, and by the recent Exploring Expedition of the United States. In the beginning of 1841, the officers of this expedition pitched their surveying tent on the highest scalp, gauged and fathomed the craters, cooked their food in the steam fissures—altogether accomplishing a sojourn replete with the most spirited adventure. A brief outline of the commander's narrative cannot fail to interest and inform the reader.

Having procured guides and baggage-men, and being fully equipped for a three weeks' sojourn, the party commenced their ascent on the 10th of December 1840. Having reached Olaa, 1138 feet above the level of the sea, they halted to rest and inspect their forces. From this point, they had no distinct path to follow, but scrambled over masses of lava. After considerable labour, they reached the great plain of the volcano, at an elevation of 4000 feet, where Mauna Loa burst upon them in all its grandeur. 'The day,' proceeds the narrator, 'was extremely fine, the atmosphere pure and clear, except a few flying clouds, and this immense dome rose before us from a plain some twenty miles in breadth. I had not until then formed any adequate idea of its magnitude and height. The whole dome appeared of a bronze colour, and its uninterrupted smooth outline was relieved against the deep blue of a tropical sky. Masses of clouds were floating around it, throwing their shadows distinctly on its sides, to which they gave occasional relief and variety. There was a bluish haze resting on the plain, that apparently gave it great distance, though this was partially counteracted by the distinctiveness of the dome. I now, for the first time, felt the magnitude of the task I had undertaken.

'So striking was the mountain, that I was surprised and disappointed when called upon by my friend Dr Judd to look at the crater of Kilauea; for I saw nothing before us but a huge pit, black, ill-looking, and totally different from what I had anticipated. There were no jets of fire, no eruptions of heated stones, no cones, nothing but a depression, that, in the midst of the vast plain by which it is surrounded, appeared small and insignificant. At the further end was what appeared a small cherry-red spot, whence vapour was issuing, and condensing above into a cloud of silvery brightness. This cloud, however, was more glorious than any I had ever beheld, and the sight of it alone would have repaid the trouble of coming thus far.

'We hurried to the edge of the cavity, in order to get a view of its interior, and as we approached, vapour issuing from numerous cracks showed that we were passing over ground beneath which fire was raging. The rushing of the wind past us was as if it were drawn inwards to support the combustion of some mighty conflagration. When the edge is reached, the extent of the cavity becomes apparent, and its depth became sensible by comparison with the figures of some of our party who had already descended. The vastness thus made sensible, transfixes the mind with astonishment, and every instant the impression of grandeur and magnitude increases. To give an idea of its capacity, the city of New York might be placed within it, and when at its bottom, would be hardly noticed; for it is three and a half miles long, two and a half wide, and over a thousand feet deep. A black ledge surrounds it at the depth of six hundred and sixty feet, and thence to the bottom is three hundred and eighty-four feet. The bottom looks, in the daytime, like a heap of smouldering ruins. The descent to the ledge appears to the sight a short and easy task, but it takes an hour to accomplish.

'We pitched our tents in full view of the volcano, on its western side, and the natives busied themselves in building temporary huts to shelter them from the cold blast that rushed by. All this was accomplished, and we had time to take another view of the crater before dark.

'All usual ideas of volcanic craters are dissipated upon seeing this. There is no elevated cone, no igneous matter or rocks ejected beyond the rim. The banks appear as if built of massive blocks, which are in places clothed with ferns, nourished by the issuing vapours. What is wonderful in the day, becomes ten times more so at night. The immense pool of cherry-red liquid lava, in a state of violent ebullition, illuminates the whole expanse, and flows in all directions like water, while the illuminated cloud hangs over it like a vast canopy.

'We sat on its northern bank for a long time in silence, until one of the party proposed we should endeavour to reach the bank nearest to and over the lake; and having placed ourselves under the direction of Mr Drayton, we followed him along the edge of the western bank; but although he had been over the ground the day before, he now lost his way, and we found ourselves still on the upper bank, after walking two or three miles. We then resolved to return to the first place that appeared suitable for making a descent, and at last one was found, which, however, proved steep and rugged. In the darkness we got many a fall, and received numerous bruises; but we were too near the point of our destination to turn back without fully satisfying our curiosity. We finally reached the second ledge, and soon came to the edge of it: we were then directly over the pool or lake of fire, at the distance of about five hundred feet above it; and the light was so strong, that it enabled me to read the smallest print. This pool is fifteen hundred feet long by one thousand wide, and of an oval figure.

'I was struck with the absence of any noise, except a low murmuring like that which is heard from the boiling of a thick liquid. The ebullition was (as is the case where the heat is applied to one side of a vessel) most violent near the northern side. The vapour and steam that were constantly escaping were so rarefied as not to impede the view, and only became visible in the bright cloud above us, which seemed to sink and rise alternately. We occasionally perceived stones, or masses of red-hot matter, ejected to the height of about seventy feet, and falling back into the lake again.

'The lake was apparently rising, and wanted but a few feet of overflowing its banks. When I began to reflect upon the position we were in, its insecurity, and the vast and deep fires beneath, with the high basaltic walls encompassing us on all sides, the sulphureous fumes and broad glare, throwing such enormous masses of stone in strong relief by their own fusion, I found it difficult to comprehend how such a reservoir can thus be pent up, and be viewed in such close proximity, without accident or danger. The whole party was perfectly silent, and the countenance of each individual expressed the feeling of awe and wonder which I felt in so great a degree myself, and which the scene was so well calculated to excite.'

Having determined to encamp at Kilauea for a few days, the exploration of the crater was the next subject that engaged their attention. This was done with great difficulty and no little danger. 'The pathway leads down on the north-east side over frightful chasms, sometimes on a mere edge of earth, and on rocks rent asunder to the depth of several hundred feet. Through these fissures steam issues, which, as it reaches the upper part, condenses, and gives nourishment to masses of ferns, and an abundance of small bushes (vaccinium), bearing a small berry of an agreeable flavour, called by the natives ohela. The descent, however, is not in reality difficult, except in a few places, where it requires some care in passing over the basaltic blocks, that are here piled in confused heaps. On approaching the black ledge, which from above appeared level and smooth, it is seen to be covered with large pieces of lava, rising in places into cones thirty or forty feet high, which are apparently bound down by huge tortuous masses, which surround them like cables. In other places these are stretched lengthwise on the level

ledge, and look like hideous fiery serpents with black vitreous scales, that occasionally give out smoke, and in some cases fire.

'The immense space which I have described the crater as covering, is gradually filled with the fluid mass of lava to a certain point, above which the walls, or the surrounding soil, are no longer able to bear the pressure; it then finds vent by an eruption, previous to which, however, a large part that is next to the walls of the crater has in a measure become cooled, and remains fixed at the level it had attained. After the eruption, the central mass therefore alone subsides three or four hundred feet, and leaves the portion that has become solid, forming a kind of terrace or shelf: this is what constitutes the "black ledge," and is one of the most striking features of the crater. Its surface is comparatively level, though somewhat uneven, and is generally coated with a vitreous, and in some places a scoriaceous lava, from half an inch to an inch thick, very iridescent and brittle. In walking over this crust, it crumbles and cracks under the feet: it seems to be easily decomposed, and in some places had lost its lustre, having acquired a grayish colour, and become friable.

'To walk on the black ledge is not always safe, and persons who venture it are compelled for safety to carry a pole, and feel before they tread over the deceitful path, as though they were moving on doubtful ice. The crackling noise made in walking over this crisp surface (like a coating of blue and yellow glass) resembles that made by treading on frozen snow in very cold weather. Here and there are seen dark pits and vaulted caverns, with heated air rushing from them. Large and extended cracks are passed over, the air issuing from which, at a temperature of 180 degrees, is almost stifling. Masses are surmounted that it would seem as if the accumulated weight of a few persons would cause to topple over, and plunge the whole into the fiery pool beneath.

'On approaching the large lake at the southern end of the crater, the heat becomes almost too stifling to bear. I shall not soon forget my employment therein, in measuring a base to ascertain the extent and capacity of the lake, of which some account will be given hereafter. At about two-thirds of the distance from the north end are extensive sulphur banks, from the fissures in which much steam is continually escaping: in these fissures are seen many beautiful crystals adhering to their sides; while on the bank itself, some specimens of sulphate of copper, in beautiful blue crystals, were found.

'From many places on the black ledge a bluish smoke was seen issuing, smelling strongly of sulphur, and marked by an efflorescence of a white tasteless powder among the cavities: this it was difficult to detach without scalding the fingers. There were many cracks where our sticks were set on fire, and some places in the vaulted chambers beneath where the rock might be seen red-hot.

'The black ledge is of various widths, from six hundred to two thousand feet. It extends all around the cavity, but it is seldom possible to pass around that portion of it near the burning lake, not only on account of the stifling fumes, but of the intense heat. In returning from the neighbourhood of the lake to the point where we began the ascent, we were one hour and ten minutes of what we considered hard walking; and in another hour we reached the top of the bank. This will probably give the best idea of its extent, and the distance to be passed over in the ascent from the black ledge, which was found six hundred and sixty feet below the rim.

'To the bottom of the crater there was a descent at the north-west angle of the black ledge, where a portion of it had fallen in, and afforded an inclined plane to the bottom. This at first appeared smooth and easy to descend, but on trial it proved somewhat difficult, for there were many fissures crossing the path at right angles, which it was necessary to get over, and the vitreous crust was so full of sharp spicules, as to injure the hands and cut the shoes at every step. Messrs Waldron and Drayton, after much toil, finally reached the floor of the crater. This was afterwards ascertained to be three hundred and eighty-four feet below the black ledge, making the whole depth nine hundred and eighty-seven feet below the northern rim. Like the black ledge, it was not found to have the level and even surface it had appeared from above to possess: hillocks and ridges, from twenty to thirty feet high, ran across it, and were in some places so perpendicular, as to render it difficult to pass over them. The distance they traversed below was deceptive, and they had no means of ascertaining it but by the time it took to walk it, which was upwards of two hours, from the north extreme of the bottom to the margin of the large lake. It is extremely difficult to reach this lake, on account of its overflowing at short intervals, which does not allow the fluid mass time to cool. The nearest approach that any one of the party made to it at this time was about fifteen hundred or two thousand feet; they were then near enough to burn their shoes and light their sticks in the lava which had overflowed during the preceding night.

'The smaller lake was well viewed from a slight eminence. This lake was slightly in action; the globules (if large masses of red fluid lava, several tons in weight, can be so called) were seen heaving up at regular intervals, six or eight feet in height; and smaller ones were thrown up to a much greater elevation. At the distance of fifty feet, no gases were to be seen, nor was any steam evident, yet a thin smoke-like vapour arose from the whole fluid surface: no puffs of smoke were perceived at any time.

'At first, it seemed quite possible to pass over the congealed surface of the lake to within reach of the fluid, though the spot on which they stood was so hot as to require their sticks to be laid down to stand on. This idea was not long indulged in, for in a short time the fluid mass began to enlarge: presently a portion would crack, and exhibit a bright-red glare; then in a few moments the lava stream would issue through, and a portion would speedily split off, and suddenly disappear in the liquid mass. This kind of action went on until the lake had extended itself to its outer bank, and had approached to within fifteen feet of their position, when the guide said it was high time to make a retreat.'

The crater now described being, as already stated, on a shoulder of the hill, the summit or great dome impending over it remained to be scaled. The ascent was accordingly commenced on the 18th of December, and proved fully more fatiguing and hazardous than the previous part of the journey. As they ascended, every trace of vegetation disappeared; fierce blasts swept the mountain side; snow began to fall; and the thermometer went down successively to 25, 18, and 15 degrees. It stood at this, with a heavy fall of snow, when they reached the summit—13,760 feet above the level of the ocean. 'Nothing can exceed the devastation of the mountain: the whole area of it is one mass of lava, that has at one time been thrown out in a fluid state from its terminal crater. There is no sand or other rock; nothing but lava, on whichever side the eye is turned. To appearance, it is of different ages, some of very ancient date, though as yet not decomposed; and the alternations of heat and cold, with rain and snow, seem to have united in vain for its destruction.' Having attained the summit of the mountain, which exhibited all the traces of an extinct volcano, 'the sight was surpassingly grand. In the distance, the island of Maui emerged from and broke the line of the deep blue horizon, while its lower side was dimmed by a whitish haze, that seemed to unite it to the island of Hawaii. The same haze enveloped the hills of Kohala on our right, and the western extremity of Hawaii. Nearer to us was Hualalai, the third great mountain of Hawaii, up whose sides a compact mass of white fleecy clouds was impelled by the sea-breeze. To our right rose in bold relief Mauna Kea, covered with its snowy mantle; and at our feet was spread out, between the three great mountains, the black plain of lava, overhung by a dusky pall of clouds. All these features were so blended into each other by the mist, as to exhibit a tone of harmony that could hardly be conceived, considering the variety of the forms, characters, and distances of the objects, and which seemed to blend earth, sea, and sky into one. I can never hope again to witness so sublime a scene, to gaze on which excited such feelings, that I felt relieved when I turned from it to engage in the duties that had called me to the spot.'

Operations were now commenced for their survey. A rude enclosure of clinkers and scoriæ was built forty feet distant from the edge of the terminal crater; the tents were erected inside; and everything so disposed as to render tolerable a temperature varying in one day from 84 to 13 degrees. The attendants, most of whom had been left at various stations below, now brought the surveyors supplies of food and water, and thus they were enabled to prosecute their observations, and examine the phenomena of the terminal crater, without obstruction. This crater, or rather craters—for there are two, separated by a narrow partition of compact lava and clinkers—is an immense depression, with an elevated brim about twenty miles in circumference, which gradually narrows by successive ledges to the depth of eight or nine hundred feet. It has been dormant for many years, but is still filled with fissures and caverns, which emit steam and sulphureous vapours. 'Dr Judd, the sergeant, and Brooks, descended into the crater; they made the descent on the east bank among large blocks of lava, and reached the bottom in about an hour. There they were surrounded by huge clinkers and ridges, running generally north and south in lines across the crater; between these was the pahoihoi, or smooth lava. They passed over these obstructions to the south-west, and found in places many salts, among which were sulphate of soda and sulphate of lime. Four-fifths of the way across was a hill two hundred feet high, composed of scoria and pumice, with fissures emitting sulphurous acid gas. To the west was a plain full of cracks and fissures, all emitting more or less steam and gas. They found the west wall perpendicular; its lower strata were composed of a gray basalt. For three-fourths of the distance up it had a dingy yellow colour; above this there are a number of thin layers, apparently dipping to the south-west with the slope of the mountain. They also visited many steam cracks on the north-east side, from which fumes of sulphurous acid gas were emitted; no hydrogen was found in the gas, which extinguished flame without producing explosion.'

On the 13th of January preparations were made for the descent, and this they accomplished by the same route, but with greater difficulty, as many of the men were worn out, their shoes gone, and not a few suffering severely from the mountain sickness. On their way they again halted at Kilauea, where Dr Judd, anxious to obtain some rare specimens of lava, as well as a vesselful of the molten matter, met with a very narrow escape. He had descended into a small detached crater thirty-eight feet deep by two hundred in diameter; smoke and a little igneous matter were issuing from a small cone in its centre; but with this exception, a crust of solid lava covered the bottom. While advancing downwards, 'he saw and heard a slight movement in the lava about fifty feet from him, which was twice repeated, and curiosity led him to turn to approach the place where the motion occurred. In an instant the crust was broken asunder by a terrific heave, and a jet of molten lava, full fifteen feet in diameter, rose to the height of about forty-five feet with a most appalling noise. He instantly turned, for the purpose of escaping, but found that he was now under a projecting ledge, which opposed his ascent, and that the place where he had descended was some feet distant. The heat was already too great to permit him to turn his face towards it, and was every moment increasing; while the violence of the throes, which shook the rock beneath his feet, augmented. Although he considered his life as lost, he did not omit the means for preserving it; but offering a mental prayer for the Divine aid, he strove, although in vain, to scale the projecting rock. While thus engaged, he called in English upon his native attendants for aid; and looking upwards, saw the friendly hand of Kalumo—who on this fearful occasion had not abandoned his spiritual guide and friend—extended towards him. Ere he could grasp it, the fiery jet again rose above their heads, and Kalumo shrunk back, scorched and terrified, until, excited by a second appeal, he again stretched forth his hand, and seizing Dr Judd's with a giant's grasp, their joint efforts placed him on the ledge. Another moment, and all aid would have been unavailing to save Dr Judd from perishing in the fiery deluge.'

After much breakneck and foolhardy adventure among the craters, steam fissures, and fumiroles of Kilauea, the party made their final descent, which was accomplished after an absence of forty-two days; 'and it was delightful,' adds the narrator, 'to feel ourselves as it were at home again, after so arduous and fatiguing an expedition.'

SIR WALTER SCOTT AND WILLIAM LAIDLAW.

CONCLUDING ARTICLE.

The subsequent intercourse of Mr Laidlaw with the great minstrel may be traced with sufficient minuteness in Lockhart's Life of Scott. After some unsuccessful speculations and considerable losses, the 'gentle forester' went to reside permanently at Abbotsford. He planned, carried out, or assisted in the rural improvements—superintended the planting or thinning of the woods (an occupation equally dear to Sir Walter), looked after the tenants and labourers—or, when the day was stormy or the season severe, joined the 'genius of the place' in his antique library or study, and occasionally wrote to his dictation. Latterly, when the evil days had come to Abbotsford, he was a constant amanuensis some hours every morning—the anxious novelist looking with eager and morbid haste towards the completion of his task, and watching each successive leaf as it was written and laid on the pile of paper. When his mind was entire, he threw off his images and conceptions with careless ease and facility. 'I never saw him much elated or excited in composition,' said Laidlaw; 'but one morning when he was out of doors concocting that simple but humorous song, Donald Caird. I watched him limping along at good five miles an hour, along the ridge or sky-line opposite Kaeside, and when he came in, he recited to me the fruits of his walk.' In dictating any part of his novels, he seemed not to attend to the expression, but to the continuity of his tale or dialogue. He had obviously arranged his plot and incidents for the day ere he descended from his bedroom, and the *style* he left to chance. His memory was an inexhaustible repertory, so that Hogg, in his moments of superexaltation and vanity, used to say that, if he had the *shirra's* memory, he would beat him as a poet!

According to Mr Laidlaw, Scott did not like to speak about his novels after they were published, but was fond of canvassing the merits and peculiarities of the characters while he was engaged in the composition of the story. 'He was peculiarly anxious,' says Mr Laidlaw, 'respecting the success of Rebecca in Ivanhoe. One morning, as we were walking in the woods after our forenoon's labour, I expressed my admiration of the character, and, after a short pause, he broke out with—"Well, I think I shall make something of my Jewess." Latterly, he seemed to indulge in a retrospect of the useful effect of his labours. In one of these serious moods, I remarked that one circumstance of the highest interest might and ought to yield him very great satisfaction; namely, that his narratives were the best of all reading for young people. I had found that even his friend Miss Edgeworth had not such power in engaging attention. His novels had the power, beyond any other writings, of arousing the better passions and finer feelings, and the moral effect of all this, I added, when one looks forward to several generations—every one acting upon another—must be immense. I well recollect the place where we were walking at this time—on the road returning from the hill towards Abbotsford. Sir Walter was silent for a minute or two, but I observed his eyes filled with tears.'

Of all his contemporaries Scott spoke kindly and warmly: he seemed to be entirely free from literary jealousy. 'I had many conversations with him,' Laidlaw remarks, 'concerning the life and poetry of Byron, particularly after the date of a visit paid to Abbotsford by Lady Byron. He seemed to regret very much that Byron and he had not been thrown more together. He

felt the influence he had over his great contemporary's mind, and said there was so much in it that was very good and very elevated, that any one whom he much liked could, as he thought, have withdrawn him from many of his errors.'

The following note by Laidlaw is interesting both on account of the fact and the opinion it contains:—'I have more than once (such was his modesty) heard Sir Walter assert that, had his father left him an estate of L.500 or L.600 a-year, he would have spent his time in miscellaneous reading, not writing. This, to a certain extent, might have been the case; and had he purchased the property of Broadmeadows, in Yarrow, as he at one time was very anxious to do, and when the neighbouring land was in the possession of independent proprietors, the effect might have been the same. At Abbotsford, surrounded by little lairds, most of them ready to sell their lands as soon as he had money to advance, the impulse to exertion was incessant; for the desire to possess and to add increased with every new acquisition, until it became a passion of no small power. Then came the hope to be a large landed proprietor, and to found a family.'

The correspondence between Sir Walter Scott and Mr Laidlaw was chiefly devoted to their rural concerns. When the poet was in Edinburgh attending to his official duties as clerk of session, he sighed for Abbotsford and the country, and took the liveliest interest in all that was going on under the superintendence of his friend. Passages like the following remind us of the writings of Gilpin and Price on forest and picturesque scenery:—'George must stick in a few wild roses, honeysuckles, and sweet-briers, in suitable places, so as to produce the luxuriance we see in the woods which nature plants herself. We injure the effect of our plantings, so far as beauty is concerned, very much by neglecting underwood.' 'I want to know how you are forming your glades of hard-wood. Try to make them come handsomely in contact with each other, which you can only do by looking at a distance on the spot, then and there shutting your eyes as you have done when a child looking at the fire, and forming an idea of the same landscape with glades of woodland crossing it. Get out of your ideas about expense. It is, after all, but throwing away the price of the planting. If I were to buy a picture worth L.500, nobody would wonder much. Now, if I choose to lay out L.100 or L.200 to make a landscape of my estate hereafter, and add so much more to its value, I certainly do not do a more foolish thing. I mention this, that you may not feel limited, so much as you might in other cases, by the exact attention to pounds, shillings, and pence, but consider the whole on a liberal scale. We are too apt to consider plantations as a subject of the closest economy, whereas beauty and taste have even a marketable value after the effects come to be visible. Don't dot the plantations with small patches of hard-wood, and always consider the ultimate effect.'

In the midst of his business details, Scott's peculiar humour and felicity of illustration are perpetually breaking out. His relation of the simplest occurrence is vivid and characteristic. A high wind in Edinburgh, in January 1818, he thus notices:—'I had more than an anxious thought about you all during the gale of wind. The Gothic pinnacles were blown from the top of Bishop Sandford's Episcopal chapel at the end of Prince's Street, and broke through the roof and flooring, doing great damage. This was sticking the horns of the mitre into the belly of the church. The devil never so well deserved the title of Prince of the power of the air since he has blown down this handsome church, and left the ugly mass of new building standing on the North Bridge.'

We add a few more sentences:—'Political publications must always be caricatures. As for the mob of great cities whom you accuse me of despising too much, I think it is impossible to err on that side. They are the very *riddlings* of society, in which every useful cinder is, by various processes, withdrawn, and nothing left but dust, ashes, and filth. Mind, I mean the mob of cities, not the lowest people in the country, who often, and indeed usually, have both character and intelligence.'

'I am made president of the Royal Society [1820], so I would have you in future respect my opinion in the matter of *chuckie-stanes*, caterpillars, fulminating powder, and all such wonderful works of nature. I feel the spirit coming on me, and never pass an old quarry without the desire to rake it like a cinder-sifter.'

Scott's opinion of modern Gothic architecture is thus incidentally announced. When in London in 1821, he writes—'I have got a very good plan from Atkinson for my addition, but I do not like the outside, which is modern Gothic, a style I hold to be equally false and foolish. Blore and I have been at work to *Scottify* it, by turning battlements into bartisans, and so on. I think we have struck out a picturesque, appropriate, and entirely new line of architecture.'

Abbotsford must certainly be considered *picturesque*, but it is a somewhat incongruous pile, and without the beautiful garden-screen in front, the general effect would be heavy. Here is another scrap—

'DEAR WILLIE—I am glad to send you the Maga [Blackwood's Magazine], which continues to be clever. I hope for two or three happy days on the brae-sides about the birthday [4th of June]. Blackwood has been assaulted by a fellow who came from Glasgow on purpose, and returned second best. The bibliopole is like the little French lawyer, who never found out he could fight till he was put to it, and was then for cudgelling all and sundry. You never saw anything so whimsical. * * I think often, of course, about my walks, and I am sickening to descend into the glen at the little waterfall by steps. We could cut excellent ones out where the quarry has been. It is the only way we shall ever make what Tom Purdie calls a *neat job*, for a deep descent will be ugly, and difficult to keep. I would plant betwixt the stair and the cascade, so as to hide the latter till you came down to the bottom.'

The employment of the people about Abbotsford seems to have engaged much of Sir Walter's attention, and on such subjects his views were patriotic and enlightened. In a letter dated December 1819, he says—'Above all, I would employ the people in draining wherever it is necessary, or may be improved. In this way many hands may be employed, and to the permanent advantage of the property. Why not drain the sheep-walk to purpose? As it is my intention to buy no books, and avoid all avoidable expenses, I hope to be able to spare L.100 or so extraordinary for my neighbours. I should be sorry that any of them thought I did this from either doubting them or fearing them. I have always consulted their interest in gratifying my own humour, and if they could find many a wiser master, they would scarce find any one more for their purpose.'

The same year (which was a period of some excitement and discontent) he writes again to Laidlaw—'I am glad you have got some provision for the poor. They are the minors of the state, and especially to be looked after; and I believe the best way to prevent discontent is to keep their minds moderately easy as to their own provision. The sensible part of them may probably have judgment enough to see that they could get nothing much better for their class in general by an appeal to force, by which, indeed, if successful, ambitious individuals might rise to distinction, but which would, after much misery, leave the body of the people just where it found them, or rather much worse.'

This considerate benevolence and liberality produced the expected reward. The labouring classes on the estate of Abbotsford and its neighbourhood were strongly attached to their illustrious master. At a later period, when the excitement of the Reform Bill penetrated even the most remote and quiet districts, Scott's popularity appeared to be partially shaded; but it was only a momentary cloud, and it occurred chiefly

with the town population, not with the rural classes. In March 1831, he was present at a meeting of the freeholders of Roxburgh, held at Jedburgh, to pass resolutions against the Reform Bill. He was dragged to the meeting by the young Duke of Buccleuch and Mr Henry Scott of Harden, contrary to his prior resolution, and his promise to Miss Scott; for his health was then much shattered. 'He made a confused imaginative speech,' says Laidlaw, 'which was full of evil forebodings and mistaken views. The people who were auditors, in proportion to their love and reverence for him, felt disappointed and sore, and, like himself, were carried away by their temporary chagrin, to the great regret of the country around. The same people a few weeks afterwards, when Mr Oliver, the sheriff of Roxburgh, was foolishly swearing in constables at Melrose, said boldly, they need not bring them to fight against reform, for they would fight for it, but if any one meddled with Sir Walter Scott, they would fight for him.'

On all such subjects Scott and Laidlaw had frequent arguments, for the latter, as Lockhart says, was always a stout Whig. Sir Walter acknowledged to Hogg that he never found a mind so inexhaustible as Laidlaw's, for he had always something new to communicate, either in the way of speculation, information, or experiment.

The great crash in 1825-26, which involved the pecuniary ruin of Sir Walter, led to the breaking up of his establishment, and the derangement of all his plans. He announces the stunning event in an affecting letter to Mr Laidlaw, from which we extract a few passages:—'For you, my dear friend, we must part—that is, as laird and factor—and it rejoices me to think that your patience and endurance, which set me so good an example, are like to bring round better days. You never flattered my prosperity, and in my adversity, it is not the least painful consideration that I cannot any longer be useful to you. But Kaeside, I hope, will still be your residence, and I will have the advantage of your company and advice, and probably your services as amanuensis. Observe, I am not in indigence, though no longer in affluence, and if I am to exert myself in the common behalf, I must have honourable and easy means of life, although it will be my inclination to observe the most strict privacy, the better to save expense, and also time. Lady Scott's spirits were affected at first, but she is getting better. *For myself, I feel like the Eildon Hills—quite firm, though a little cloudy. I do not dislike the path which lies before me. I have seen all that society can show, and enjoyed all that wealth can give me, and I am satisfied much is vanity, if not vexation of spirit.* What can I say more? except that I will write to you the instant I know what is to be done. In the meantime, it is only necessary to say I am arranging my affairs, and mean to economise a good deal, and that I will pay every man his due.'

The following brief and pleasant note, without date, must be referred to 1827, as it was in June of that year that the Life of Napoleon was published:—

'My Dear Mr Laidlaw—I would be happy if you would come down at *hail-time* to-day. Napoleon (6000 copies) is sold for L.11,000!!! Yours truly, W. S.'

'*Sunday.*'

Mr Laidlaw at length removed from Kaeside, and Scott felt sorely the want of his habitual counsel and society. Under the date of August 1827, he writes in the following affectionate strain:—'Your leaving Kaeside makes a most melancholy blank to us. You, Mrs Laidlaw, and the bairns, were objects we met with so much pleasure, that it is painful to think of strangers being there. But they do not deserve good weather who cannot endure the bad, and so I would "set a stout heart to a stey [steep] brae;" yet I think the loss of our walks, plans, discussions, and debates, does not make the least privation that I experience from the loss of world's gear. But, *sursum corda*, and we shall have many happy days yet, and spend some of them together. I expect Walter and Jane, and then our long-separated family will be all together in peace and happiness. I hope Mrs Laidlaw and you will come down and spend a few days with us, and revisit your old haunts. I miss you terribly at this moment, being engaged in writing a planting article for the Quarterly, and not having patience to make some necessary calculations.'

Mr Laidlaw has written on the back of the communication—'This letter lies in the drawer in which the unfinished manuscript of Waverley was found, amongst fishing-tackle, &c. which yet remain. I got the desk as a present from Sir Walter.'

In 1830, a re-union took place. Mr Laidlaw took up his abode again at Kaeside, and remained in daily intercourse with Sir Walter till the time of his death. The record of those sad and painful days in Lockhart's Life is deeply interesting. Never was there a more affecting narrative; nor could there be a more instructive or ennobling example than Scott presented in his period of suffering and adversity. We will not attempt to lift the curtain again on this tragic scene, which saddened all Europe.

> A trouble, not of clouds, or weeping rain,
> Nor of the setting sun's pathetic light
> Engendered, hangs o'er Eildon's triple height!
> —*Wordsworth.*

Mr Laidlaw cherished with religious care all his memorials of Abbotsford, where, indeed, his heart may be said to have remained till its last pulsation. The desk in which the first manuscript of Waverley was deposited [see the introduction to the novel] stood in his room; the works inscribed and presented by the author were carefully ranged on his shelves; the letters he had received from him were treasured up; the pens with which Ivanhoe was written were laid past, and kept as a sacred thing; but, above all, he valued a brooch which was round the neck of Scott when he died. This ornament had been presented to Sir Walter Scott by his son, the present Sir Walter, and his wife (inscribed 'From Walter and Jane'), on the day of their marriage, and it contained some of the hair of each. When the grave had closed over the illustrious minstrel, his children gave the invaluable jewel to their own and their father's friend, accompanying the gift with some of the hair of Scott, which was also placed in the brooch—the white locks of age with the dark tresses of youth. Mr Laidlaw wore the brooch while a trace of sensibility remained, and it has descended to another generation—one of the most precious of the personal *reliquiæ* of a splendid but melancholy friendship.

THE LOCKSMITH OF PHILADELPHIA.

A STORY.*

Some years ago, in the city of Philadelphia, there lived an ingenious locksmith named Amos Sparks. Skilled as a maker and repairer of locks, he was particularly celebrated for his dexterity in opening them, when it was necessary to do so in cases of emergency. Like many men of talent in other departments, Amos Sparks was poor. Though a very industrious and prudent man, with a small and frugal family, he merely obtained a comfortable subsistence, but he never seemed to accumulate property. Whether it was that he was not of the race of money makers, whose instinctive desire of accumulation forces them to earn and hoard without a thought beyond the mere means of acquisition—or whether the time occupied by the prosecution of new inquiries into still undiscovered regions of his favourite pursuit, and in conversation with those who came to inspect and admire the fruits of his ingenuity, were the cause of his poverty, we cannot undertake to determine—but perhaps various causes combined to keep his finances low;

* We have abridged this story from a tale in an American newspaper, which we regret does not give the name of the writer.

and it was quite as notorious in the city that Amos Sparks was a poor man, as that he was an ingenious mechanic. But his business was sufficient for the supply of his wants and those of his family, and so he studied and worked on, and was content.

It happened that, in the autumn of 18—, a merchant in the city, whose business was extensive, and who had been bustling about the quay and on board his vessels all the morning, returned to his counting-house to lodge several thousand dollars in the Philadelphia bank, to renew some paper falling due that day; when, to his surprise, he had either lost or mislaid the key of his iron chest. After diligent search, with no success, he was led to conclude that, in drawing out his handkerchief, he had dropped the key in the street, or perhaps into the dock. What was to be done? It was one o'clock—the bank closed at three, and there was no time to advertise the key, or to muster so large a sum of money as that required. In his perplexity the merchant thought of the poor locksmith. He had often heard of Amos Sparks; the case seemed one particularly adapted to a trial of his powers—and being a desperate one, if he could not furnish a remedy, where else were there reasonable expectations of succour? A clerk was hurried off for Amos, and having explained the difficulty, speedily reappeared, followed by the locksmith with his implements in his hand.

The job proved more difficult than had been anticipated, and, fearful of losing credit by the delay, the merchant offered five dollars' reward to Amos if he would open the chest in as many minutes. Amos succeeded. The lock was picked, and the chest flew open. There the merchant's treasures lay, but they were not yet in his possession. As he enjoyed but a poor reputation for uprightness of dealing, Amos could not trust to his promise of payment. Holding the lid in his hand, he respectfully requested the sum which had been offered; and, as he had expected, it was refused. A much less sum was meanly proposed in its stead, on the plea that it was surely sufficient for a few minutes' work. Amos was indignant and inexorable. The merchant shuffled and fumed. In an instant down went the lid of the chest, and, fastening by a spring, it was again locked as securely as before.

The merchant looked aghast at Amos, and then darted a glance at the clock: the hand pointed to within twenty minutes of three, and seemed posting over the figures with the speed of light. What was to be done? At first he tried to bully, but it would not do. Amos told him, if he had sustained any injury, 'he might sue as soon as he pleased, for that his time was too precious just now to be wasted in trifling affairs;' and, with a face of unruffled composure, he turned on his heel and was leaving the office.

The merchant called him back—he had no alternative—his credit was at stake—he was humbled by the necessity of the case; and handing forth the five dollars, 'There, Sparks,' said he, 'take your money, and let us have no more words.'

'I must have ten dollars now,' replied the locksmith. 'You would have taken advantage of a poor man; and, besides opening your strong box there, I have a lesson to offer which is well worth a trifling sum. You would not only have deprived me of what had been fairly earned, but have tempted me into a lawsuit which would have ruined my family. You will never in future presume upon your wealth in your dealings with the poor, without thinking of the locksmith, and those five dollars may save you much sin and much repentance.'

This homily, besides being preached in a tone of calm determination, which left no room to hope for any abatement, had exhausted another minute or two of the time already so precious. The merchant hurriedly counted out the ten dollars, which Amos deliberately inspected, to see that they belonged to no insolvent bank, and then deposited them in his pocket. Having thus made quite sure of his reward, he dexterously opened the lock, and placed the merchant in possession of his property, in time to save his credit at the bank.

About a month after this affair, the Philadelphia bank was robbed of coin and notes to the amount of fifty thousand dollars. The bars of a window had been cut, and the vault entered so ingeniously, that it was evident the burglar had possessed, besides daring courage, a good deal of mechanical skill. The police scoured the city and country round about, but no clue to the discovery of the robbery could be traced. The public mind was powerfully excited. Everybody who had anything to lose, felt that daring and ingenious felons were abroad, who might probably pay them a visit; all were therefore interested in the discovery and the conviction of the perpetrator of so daring a deed. Suspicions at length began to settle on Sparks; but yet his poverty and known integrity seemed to give them the lie. The story of the iron chest, which the merchant had hitherto been ashamed, and Amos too forgiving, to tell—for the latter did not care to set the town laughing at the man who had wronged him—now began to be told. The merchant, influenced by a vindictive spirit, had whispered it to the directors of the bank, with sundry shrugs and inuendos; and of course it soon spread far and wide, with all sorts of exaggerated variations and additions. Amos thought for several days that some of his neighbours looked and acted rather oddly, and he missed one or two who used to drop in and chat almost every afternoon; but not suspecting for a moment that there was any cause for altered behaviour, these matters made but a slight impression on his mind. In all such cases, the person most interested is the last to hear disagreeable news; and the first hint that the locksmith got of the universal suspicion was from the officer of the police, who came with a party of constables to search his premises. Astonishment and grief were the portion of Amos and his family for that day. The first shock to a household who had derived, even amidst their humble poverty, much satisfaction from the possession of a good name—a property they had been taught to value above all earthly treasures—may be easily conceived. To have defrauded a neighbour of sixpence would have been a meanness no one of them would have been guilty of; but Fifty Thousand Dollars!!—the immensity of the sum seemed to clothe the suspicion with a weight of terror that nearly pressed them to the earth. They clung to each other, with bruised and fettered spirits, while the search was proceeding, and it was not until it was completed, and the officer declared himself satisfied that there was none of the missing property on the premises, that they began to rally, and looked calmly at the circumstances which seemed for the moment to menace the peace and security they had hitherto enjoyed.

'Cheer up, my darlings,' said Amos, who was the first to recover the sobriety of thought that usually characterised him—'cheer up—all will yet be well; it is impossible that the unjust suspicion can long hover about us. A life of honesty and fair-dealing will not be without its reward. There was perhaps something in my trade, and the skill which long practice had given me in it, that naturally enough led the credulous, the thoughtless, and perhaps the mischievous, if any such there be connected with this inquiry, to look towards us. But the real authors of this outrage will probably be discovered soon, for a fraud so extensive will make all parties vigilant; and if not, why, then, when our neighbours see us toiling at our usual occupations, with no evidences of secret wealth, or lavish expenditure, on our persons or at our board, and remember how many years we have been so occupied and so attired, without a suspicion of wrongdoing even in small matters attached to us, there will be good sense and good feeling enough in the city to do us justice.'

There was sound sense and much consolation in this reasoning: the obvious probabilities of the case were in favour of the fulfilment of the locksmith's expectations. But a scene of trial and excitement—of prolonged agony and hope deferred—lay before him, the extent of which

it would have been difficult, if not impossible, for him then to have foreseen. Foiled in the search, the directors of the bank sent one of their body to negotiate with Amos—to offer him a large sum of money, and a guarantee from further molestation, if he would confess, restore the property, and give up his accomplices, if any there were. It was in vain that he protested his innocence, and avowed his abhorrence of the crime. The banker rallied him on his assumed composure, and threatened him with consequences; until the locksmith, who had been unaccustomed to dialogues founded on the presumption that he was a villain, ordered his tormentor out of his shop, with the spirit of a man who, though poor, was resolved to preserve his self-respect, and protect the sanctity of his dwelling from impertinent and insulting intrusion.

The banker retired, baffled, and threatening vengeance. A consultation was held, and it was finally determined to arrest Sparks and commit him to prison, in the hope that, by shutting him up, and separating him from his family and accomplices, he would be less upon his guard against the collection of evidence necessary to a conviction, and perhaps be frightened into terms, or induced to make a full confession. This was a severe blow to his family. They would have borne much together—for mutual counsel and sympathy can soothe many of the ills of life; but to be divided—to have the strongest mind, around which the feeble ones had been accustomed to cling, carried away captive, to brood in solitary confinement, on an unjust accusation, was almost too much, when coupled with the cloud of suspicion that seemed to gather around their home, and infect the very air they breathed. The privations forced upon them by the want of the locksmith's earnings were borne without a murmur; and out of the little that could be mustered, a portion was always reserved to buy some trifling but unexpected comfort or luxury to carry to the prisoner.

Some months having passed without Sparks having made any confession, or the discovery of any new fact whereby his guilt might be established, his prosecutors found themselves reluctantly compelled to bring him to trial. They had not a tittle of evidence, except some strange locks and implements found in the shop, and which proved the talent, but not the guilt, of the mechanic. But these were so various, and executed with such elaborate art, and such an evident expenditure of labour, that but few even of the judges, jury, or spectators, could be persuaded that a man so poor would have devoted himself so sedulously to such an employment, unless he had had some other object in view than mere instruction or amusement. His friends and neighbours gave him an excellent character; but on their cross examination, all admitted his entire devotion to his favourite pursuit. The counsel for the banker exerted himself with considerable ability. Calculating in some degree on the state of the public mind, and upon the influence which vague rumours, coupled with the evidences of the mechanic's handicraft exhibited in court, might have on the mind of the jury, he dwelt upon every ward and winding—on the story of the iron chest—on the evident poverty of the locksmith, and yet his apparent waste of time—and asked if all this work were not intended to insure success in some vast design? He believed that a verdict would be immediately followed by a confession, for he thought Amos guilty, and succeeded in making the belief pretty general among his audience. Some of the jury were half inclined to speculate on the probabilities of a confession, and, swept away by the current of suspicion, were not indisposed to convict without evidence, in order that the result might do credit to their penetration; but this was impossible, even in an American court of justice, in the good old times of which we write. Hanging persons on suspicion, and acquitting felons because the mob think murder no crime, are modern inventions. The charge of the judge was clear and decisive. He admitted that there were grounds of suspicion—that there were circumstances connected with the prisoner's peculiar mode of life that were not reconcilable with the lowness of his finances; but yet of direct testimony there was not a vestige, and of circumstantial evidence there were not only links wanting in the chain, but, in fact, there was not a single link extending beyond the locksmith's dwelling. Sparks was accordingly acquitted; but as no other clue was found to direct suspicion, it still lay upon him like a cloud. The vindictive merchant and the dissatisfied bankers did not hesitate to declare, that although the charge could not be legally brought home, they had no doubt whatever of his guilt. This opinion was taken up and reiterated, until thousands, who were too careless to investigate the story, were satisfied that Amos Sparks was a rogue. How should the character of a poor man hold out against the deliberate slanders of so many rich ones?

Amos rejoiced in his acquittal, as one who felt that the jury had performed a solemn duty faithfully, and who was glad to find that his present experience had strengthened rather than impaired his reliance on the tribunals of his country. He embraced his family as one snatched from great responsibility and peril; and his heart overflowed with thankfulness when at night they were all once more assembled round the fireside, the scene of so much happiness and amity in other days. But yet Amos felt that, though acquitted by the jury, he was not by the town: he saw that in the faces of some of the jury, and most of the audience, which he was too shrewd an observer to misunderstand. He wished it were otherwise; but he was contented to take his chance of some subsequent revelation; and if it came not, of living down the foul suspicion.

But Amos had never thought of how he was to live. The cold looks, averted faces, and rude scandal of the neighbours, could be borne, because really there was some excuse in the circumstances, and because he hoped that there would be a joyful ending of it all at some future day. But the loss of custom first opened his eyes to his real situation. No work came to his shop; he made articles, but he could not sell them; and as the little money he had saved was necessarily exhausted in the unavoidable expense of the trial, the family found it impossible, aided by the utmost exertion and economy, to meet their current outlay. One article of furniture after another was reluctantly sacrificed, or some little comfort abridged, until, at the end of months of degradation and absolute distress, their bare board was spread within bare walls, and it became necessary to beg, to starve, or to remove. The latter expedient had often been suggested in family consultations, and it is one that in America is the common remedy for all great calamities. The Sparkses would have removed, but they still clung to the hope that the real perpetrator would be discovered, and the mystery cleared up; and, besides, they thought it would be an acknowledgment of the justice of the general suspicion if they turned their backs and fled. They lived upon the expectation of the renewed confidence and companionship of old friends and neighbours, when Providence should deem it right to draw the veil aside. At length, to live longer in Philadelphia became impossible, and the whole family prepared to depart. Their effects were easily transported, and as they had had no credit since the arrest, there was nobody to prevent them from seeking a livelihood elsewhere.

Embarking in one of the river boats, they pushed up the Schuylkill, and settled at Norristown. The whole family being industrious and obliging, they soon began to gather little comforts around them; and as these were not embittered by the cold looks and insulting sneers of the neighbourhood, they were comparatively happy for a time. But even here there was for them no permanent place of rest. A traveller passing through Norristown, on his way from the capital to the Blue Mountains, recognised Sparks, and told somebody he knew that he wished the community joy of having added to the number of its inhabitants the notorious locksmith of Philadelphia. The news soon spread. The family found that they were shunned as they had formerly

been by those who had known them longer than the good people of Norristown, and had a fair prospect of starvation opening before them. They removed again. This time there was no inducement to linger, for they had no local attachments to detain them. They crossed the mountains, and, descending into the vale of the Susquehanna, pitched their tent at Sunbury. Here the same temporary success excited the same hopes, only to be blighted in the bud by the breath of slander, which seemed so widely circulated as to leave them hardly any asylum within the limits of the State. We need not enumerate the different towns and villages in which they essayed to gain a livelihood, and failed. They had nearly crossed the State in its whole length, been driven from Pittsburg, and were slowly wending their way further west, and were standing on the high ground overlooking Middleton, as though doubtful if there was to be rest for the soles of their feet even there. They hesitated to try a new experiment. Sparks seated himself on a stone beneath a spreading sycamore—his family clustered around him on the grass: they had travelled far, and were weary, and, without speaking a word as their eyes met, and thinking of their prolonged sufferings and slender hopes, they burst into a flood of tears, in which Sparks, burying his face in the golden locks of the sweet girl who bowed her head upon his knee, joined audibly. At length, wiping away his tears, and checking the rising sobs that shook his manly bosom—'God's will be done, my children,' said the locksmith; 'we cannot help weeping, but let us not murmur. If we are to be wanderers and fugitives on the earth, let us never lose sight of the promise which assures us of an eternal refuge in a place where the wicked cease from troubling and the weary are at rest. I was perhaps too proud of that skill of mine—too apt to plume myself upon it, above others whose gifts had been less abundant. My error has been that of wiser and greater men, who have been made to feel that what we cherish as the means of obtaining earthly blessings, sometimes turns out a curse.'

To dissipate the gloom which hung over the whole party, and beguile the half hour they intended to rest in that sweet spot, Mrs Sparks drew out a Philadelphia newspaper which somebody had given her upon the road, and called their attention to the deaths and marriages, that they might see what changes were taking place in a city that still interested them, though they were banished for ever from its borders. She had hardly opened the paper when her eye glanced on an article which she was too much excited to read. Amos, wondering at the emotion displayed, gently disengaged the paper, and read—'Bank robber—Sparks not the man.' His own feelings were as powerfully interested as those of his wife, but his nerves were stronger; and he read out, to an audience whose ears devoured every syllable of the glad tidings, an account of the conviction and execution of a wretch in Albany, and who had confessed, among other daring and heinous crimes, the robbery of the Philadelphia bank, accounting for the disappearance of the property, and exonerating Sparks, whose face he had never seen. These were tidings of great joy to the weary wayfarers beneath the sycamore, whose hearts overflowed with thankfulness to the Father of mercy, who had given them strength to bear the burden of affliction, and had lifted it from their spirits ere they had been crushed beneath its weight. Their resolution to return to their native city was formed at once, and before a week had passed, they were slowly journeying to the capital of the State.

Meanwhile, an extraordinary revulsion of feeling had taken place at Philadelphia. Newspapers and other periodicals which had formerly been loud in condemnation of the locksmith, now blazoned abroad the robber's confession—wondered how any man could have been for a moment suspected upon such evidence as was adduced on the trial—drew pictures of the domestic felicity once enjoyed by the Sparkses, and then painted—partly from what was known of the reality, and partly from imagination—their sufferings, privations, and wrongs in the pilgrimage they had performed in fleeing from an unjust but damnatory accusation. The whole city rang with the story. Old friends and neighbours, who had been the first to shun them, now became the loud and vehement partisans of the family. The whole city was anxious to know where they were. Some reported that they had perished in the woods; others that they had been burnt in a prairie, which not a few believed; while another class averred that the locksmith, driven to desperation, had first destroyed his family, and then himself. All these stories of course created as much excitement as the robbery of the bank had done before, only that this time the tide set the other way; and when the poor locksmith and his family, who had been driven like vagabonds from the city, approached its suburbs, they were met, congratulated, and followed by thousands: in fact, theirs was almost a triumphal entry. And as the public always like to have a victim, Sparks was advised on all hands to bring an action against the directors of the bank: large damages would, they knew, be given, and the banker deserved to suffer for the causeless ruin brought on a poor but industrious family.

Sparks was reluctant to engage in any such proceeding. His character was vindicated, his business restored. He occupied his own shop, and his family were comfortable and content. But the current of public opinion was too strong for him. All Philadelphia had determined that the banker should suffer. An eminent lawyer volunteered to conduct the suit, and make no charge if a liberal verdict were not obtained. The locksmith pondered the matter well. His own wrongs he freely forgave, but he thought that there had been a readiness to secure the interests of a wealthy corporation by blasting the prospects of a humble mechanic, which, for the good of society, ought not to pass unrebuked. He felt that the moral effect of such a prosecution would be salutary, teaching the rich not to presume too far upon their affluence, and cheering the hearts of the poor while suffering unmerited persecution. The suit was commenced, and urged to trial, notwithstanding several attempts at compromise on the part of the banker. The pleadings on both sides were able and ingenious; but the counsel for the plaintiff had a theme worthy of the fine powers he possessed. At the close of a pathetic and powerful declamation, the audience, who had formerly condemned Amos in their hearts without evidence, were melted to tears by the recital of his sufferings; and when the jury returned with a verdict of ten thousand dollars damages against the banker, the locksmith was honoured by a ride home on their shoulders amidst a hurricane of cheers.

A VISIT TO THE GREAT BRITAIN.

One fine morning lately, as hinted at in a previous article, we set out to inspect the largest steam-ship which is at present afloat. She lay off Blackwall in the Thames, near London, and, by the liberality of her proprietors, the 'Great Western Steam Navigation Company,' as well as by the admirable arrangements of the managers of the Blackwall railway, the trip proved both easy of accomplishment and inexpensive. After a ten minutes' ride from Fenchurch Street, we were safely deposited on the Blackwall pier, to await the arrival of a miniature steamer which plied between the shore and the immense ship.

To those previously informed that the Great Britain is one-third larger than a first-rate ship of war, and that she carries six masts, the first view of her from a distance is generally—in reference to her magnitude—disappointing. It is not till the bows are passed, and the eye travels from one end to the other, that the vast dimensions of the Great Britain are understood. This line, though long, being very slightly bent near the head, and again at the stern, is graceful and

elegant, not being interrupted by those hideous accompaniments to other steamers—paddle-boxes. Rowing beside her in a small boat, the distance from the fore to the after part of the ship may be likened to a short voyage. Under the rear part of the vessel, the chief novelty presents itself—which is the propeller. This is placed under the stern, between the stern post and the 'run' of the ship, and consists of a screw with six blades of solid iron, triangular in shape, fastened to a revolving shaft. Again the idea of smallness presents itself: the blades which appear above water seem quite diminutive, when it is considered what an immense mass they have to propel. The entire screw is only 15 feet 6 inches in diameter; yet, by its rapid revolutions, it has to drive forward a ship 322 feet long and 51 broad—a floating mass, in fact, equal to some 3450 tons, even when unencumbered with a cargo—and at the rate of 12 miles an hour. Viewed with reference to this enormous power, the screw appears like a mere toy.

Having glanced at the outside of the Great Britain, we ascended her side, and stood on her deck. The impressions of fragility and lightness were strengthened: the masts, even when close to them, appeared slender to insecurity; the rigging light; the bulwarks low and thin. As there is nothing to excite surprise so much as this general variance of the appearance of the actual ship with the preconceived ideas of its size and strength, it will be here necessary to explain whence this difference arises. The truth is, that, except the flooring and ornamental parts of the decks and cabins, the Great Britain is built of iron. After many experiments (for no previous experience existed to guide them), the Great Western Steam Company concluded that iron would afford greater strength, greater buoyancy, and more capacity, at less expense, than wood. The sides—formed of massive ribs varying from 14 to 21 inches apart—are lined within and covered without with plate iron five-eighths of an inch thick, so that the greater part of the sides is hollow. The bottom and keel are of solid iron, one inch thick, exclusive of the ribs. Even the rigging is of iron, for it is made of twisted wire. The quantity of metal used in the construction of the hull was 1400 tons. Now, it is easy to understand that the same number of tons' weight of the strongest wood would occupy infinitely more space, without affording additional strength: it is the closer disposition of materials about the ship which has given her the light, rakish appearance which first strikes the eye of an observer.

Of the length of the ship, the most complete *coup-d'œil* is to be obtained by walking to the after part of the deck, and thence looking straight a-head to the prow. The deck appears like two long narrow streets divided by the funnel, the six masts, the hatches, &c. which rise between them, to form one side; the bulwarks being the other. Along these two thoroughfares there is nothing to interrupt the smoothness of the wood-pavement; for the deck is what is called a 'flush' deck; that is to say, an even one, with no poop or other erection to alter its level, except at the forecastle, where there is a small break. The length of these two vistas bears so great a disproportion to their width, that the mind abandons calculation by means of feet and yards, and thinks of a mile. The actual length of this monster deck is, in fact, within a fraction of the sixteenth of a mile.

Having sufficiently examined and wondered at what was to be seen upon the upper deck, we descended to that below. This is divided into two parts by the space occupied by the cook-houses and machinery. It consists of two vast 'promenade saloons,' flanked by sleeping berths and state-rooms. The after-saloon was that which we first visited. It is elegantly fitted up and ornamented with coloured scrolls and flowers, to a degree which a man of severe taste would designate as finical. On each side of the promenade is a row of five doors, leading into the sleeping places; of which four are led to by every door, being divided by a short passage. The first door on each side of the saloon conducts to a 'ladies' boudoir,' whilst the fifth at either end opens into state or private rooms—of which there are eight—calculated for families. The sternmost part of the promenade is fitted up with sofas. The captain's cabin is a-midships, between the two companion stairs, which lead from the upper deck. Descending into the deck below, the counterpart of what had just been seen presented itself. This lower promenade is to be used as a dining-room; and, for the ladies' boudoirs, a steward's pantry and store-rooms are substituted. The number of sleeping berths is also greater, because there are no state-rooms. In the passage to the fore part of the vessel are, on one side, baths, lavatories, and other conveniences; and, on the other, the kitchen. This is most completely fitted with every conceivable apparatus for roasting, boiling, frying, grilling, and stewing; shadowing forth to all who can on a sea voyage enjoy them, a series of excellent and tempting dinners. At the end of the passage, the 'forward promenade saloon' is entered. Except in the shape, we saw nothing in the plan of this different from that of the after-saloon. It is of course much shorter, by reason of the sudden narrowing of the ship where the prow is formed. Where this narrowing begins, there is a partition, behind which are arranged the proper accommodations for the officers of the vessel. The saloon below is, like that 'aft' on the same level, the counterpart of the upper storey in general appearance, the partitioned part in the forecastle affording berths for the common sailors.

No one, after viewing these four saloons, but must be struck with the extent and completeness of accommodation which the Great Britain affords. Comfortable beds and berths are provided for as many as 360 passengers, without making up a single sofa.

Thus much of the passenger portion of the vessel; now for the locomotive department. Ascending to the upper deck, the spectator has to dive into the hot and black engine department by its own special entrance, composed of iron ladders. The bewildering mass of machinery which meets the view—bewildering rather from its vastness than from its complexity—is so distributed in the vessel as to form permanent ballast; and the middle of the ship has not to bear all its weight, as is the case in vessels with side paddles. It has to perform one very simple duty, which is to turn the screw we have already described, at the stern, with sufficient velocity to propel the ship. To effect this, four engines—the united power of which equals that of 1000 horses—are employed. Their action upon the machinery is readily understood. There is an enormous wheel or 'drum,' 18 feet in diameter, working on an axis or spindle. To either end of the spindle is attached an immense crank moved by one pair of engines, the other pair driving the crank at the opposite end of the axis; so that the whole four expend their force upon the gigantic drum to whirl it round. The duty of this large wheel is to cause a band composed of four iron chains to revolve with it; that, in the regions below, they may pass round and turn another and smaller wheel. Of course the chains make this little wheel revolve as much oftener as it is smaller than the *grosse caisse* or big drum; an operation they perform—a singularity in such cases—without the slightest noise. The great fault of the 'Archimedes,' in which vessel the principle adopted in the Great Britain was first tried, was the intolerable noise made by the machinery that conveyed motion to the screw. The engineers of the monster ship have obviated this objection by having each link of their chains supplied with a tooth, which juts into grooves made in both wheels, so as to 'bite' them as they pass round. Though weighing seven tons, therefore, the chains work quite silently. The little wheel below has for its axis one end of a long horizontal shaft, to the other extremity of which is attached the propeller, which we had previously seen outside at the stern, and which is made to revolve as

fast as the little wheel in the water. Here is the whole secret of propulsion in the Great Britain.

The iron shaft which communicates motion to the propeller is not the least curious part of the machinery; on account of the distance of the steam power from the stern, it is 130 feet long. Each end is of solid iron—that at the smaller wheel next the engines being 28 feet in length, with a diameter of 16 inches; that to which the propeller is fastened being of the same diameter, but only 25½ feet long. The intermediate part of the shaft is hollow, 2 feet 8 inches in diameter, and 68 feet long; and this makes up the entire longitude of 130 feet. Although so much of the shaft is hollow, it weighs 38 tons.

The immense velocity with which the shaft is made to turn in order to propel the vessel, would heat it to a dangerous degree, were not means of continual cooling employed. This is effected by numerous holes in the side of the hull, through which water is constantly poured upon and within the hollow part of the shaft. It has been calculated by actual experiment that, on an average, for every three times the engine revolves in a minute, the ship will be driven through the water 2 miles in an hour. Thus 12 revolutions per minute propels her 8 miles an hour. The rate at which the vessel is intended to work her way across the Atlantic is 12 miles per hour, which will require her engines to make 18 revolutions every minute.

Having inspected as much of the machinery as we were able to see, we were preparing to ascend, when the sound of blacksmiths' hammers induced us to look through the iron grating on which we stood. A lower abyss was revealed to us by the lurid glare of a forge fire. It was the blacksmith's shop. An iron ship is of course obliged to carry blacksmiths instead of carpenters. Not having either curiosity or courage to descend, we regained the upper deck.

The leading peculiarity of the Great Britain is her great size. On this subject much has been said both *pro* and *con*. Looking at her in a nautical and scientific point of view, it is an important advantage, for reasons which are not very generally understood. It has been ascertained from past experience, that the tonnage or power of carrying cargo increases in a triple ratio with increase of size; whilst the requisite power and fuel augments only in a twofold ratio to the increase of dimension.* On this account, we find that though the ship contains nearly 800 tons' weight of machinery, with stowage for 1200 tons of coal, and 200 tons of water (in the boilers), yet she is capable of carrying 1000 tons besides of cargo, independent of passengers. On the other hand, looking at the Great Britain in a commercial point of view, much doubt exists as to whether a sufficient number of passengers, and a sufficient quantity of goods, can be collected to make her rapid voyages to New York profitable. It is well known that the British Queen failed from want of patronage in these respects. Whether the Great Britain will prove a profitable vessel to her owners, time can only determine. We sincerely hope she may.

As regards safety, every precaution has been employed in constructing the Great Britain. She is built in distinct compartments, each water-tight, and independent of the other. All steamers, whether on the score of humanity or for the preservation of property, ought to be so built; for if a vessel be divided into five or six compartments, and any one of them should from accident fill, her buoyancy would only be slightly affected. If two compartments fill, and these two were not at the extremes, the other compartments would still keep her afloat. If two consecutive compartments, either forward or aft, fill, it is certain that, were she to go down head or stern foremost, she would be some time about it; long enough, probably, to allow of all the boats being got in readiness. The Great Britain is provided, in case of such an emergency, with four large life-boats of iron, and two boats of wood, which are suspended from davits over the side of the ship, whilst one large life-boat is kept on the deck. The whole are capable of carrying 400 persons: though by far the most effectual precaution is the system of independent compartments. As a proof of its efficacy, we may instance the case of the Nemesis, which struck some time ago on the English Stones in the Bristol Channel, going nine or ten knots an hour: she slid off, after making such a slit as filled the forward compartment. She steamed several hours with the compartment full, until she obtained additional pumps in Mount's Bay, with which the space was pumped out, and the leak stopped. At Portsmouth she was examined, and drawings of the damage were made by an employé of the Great Western Company: she was repaired in a few hours, at an expense of about L.30, and then started for China. An instance of the time a complete wreck takes to go down, so as to enable the crew to escape, was afforded by the Brigand, a large iron steamer, which had been trading between Liverpool and Bristol. She struck on sunken rocks off the Scilly Islands, filled a forward compartment, and had some part of her paddle-wheel forced so far into the engine-room as to damage the plates and fill that part also. She remained afloat, in consequence of the remaining compartments, long enough to enable the crew to save themselves and their kits comfortably, and then went down in deep water.

The Great Britain was begun in 1839, and was so far finished as to be launched on the 19th of July 1843. After this, an unforeseen circumstance occurred—she was imprisoned in the Bristol docks during several months; for, when her engines were shipped, she sunk so low as to bring her greatest breadth in contact with the too narrow sides of the lock. This caused great inconvenience to her owners, and some merriment to the public. The truth is, her dimensions were well adapted for a free passage through the locks when light, but it was deemed advisable to put the engines on board before she left the works, which rendered it imperative that a certain degree of temporary accommodation, in widening the top of the locks, should be afforded. The directors of the Dock Company having at length afforded all the requisite facilities, she was on the 12th December liberated and taken down the Avon and the Bristol Channel on her first trial trip. This proved satisfactory in every respect, and the Great Britain, in the beginning of the present year, steamed round to London, beating the fastest steamer that could be found to race with her. Since then, she has gone round to Liverpool, awaiting sailing orders for America.

We left her, much gratified by our visit; and having been put on shore, ended the day very agreeably with a dinner of white-bait, which is somehow generally associated with a visit to Blackwall.

* Vide Athenæum, No. 901.

CATTLE SHOWS.

We should imagine that the descendants of Jack Sprat, who, it may be remembered by the students of our early ballad literature, 'could eat no fat,' must have vanished from the land; or else that his progeny must have wonderfully increased, and that they all take after their mother, who, according to the bard, 'could eat no lean.' We have been led into this speculative reflection by a knowledge of the fact, that sixty thousand people went to Baker Street bazaar to see the cattle show—to feast their eyes on panting porkers, asthmatic sheep, and apoplectic oxen. We should doubt whether the meat is better because the animals are stuffed out to a size hitherto unparalleled, except on the external paintings of penny shows, where the living monsters are represented about twice the height and breadth of the caravan where the public are invited to visit them. The present, however, is the age of enlargement. Shopkeepers make arrangements for the enlargement of their premises; the legislature decrees the enlargement of prisoners for debt; newspaper proprietors enlarge their sheets; and, in order to keep pace with the enlarged views which are prevalent in the

present day, the agriculturists have commenced permanently enlarging their cattle. Perhaps the remains of gigantic animals that geologists have occasionally lighted on, may be traced to some antediluvian cattle show; and our ancestors may have rushed to an exhibition of prize mammoths with the same eagerness we of the present day evince in running after overgrown beeves, and alarmingly blown-out muttons. As we are informed that there is still 'room for improvement,' we must presume that more extensive bullocks, and more extravagantly exaggerated sheep, than any we have yet seen, are threatened by the Smithfield Cattle Club. To us there is something painfully pantomimic in the thought; and we look forward to the possibility of the extinction of mutton-chops, except as huge joints—a state of things that will be ruinous to the pure chop-house interest. Already does Brobdignagian beef choke up the entrance to the butchers' shops; and extensive, indeed, must be the scale upon which the business of weighing it is conducted. It has occurred to us, that the same care and expense which are lavished on the fattening of animals, might be beneficially applied to the feeding of our own species, and we would suggest that the experiment should be tried, by offering premiums for prize paupers. It is, however, to be feared that the prize pauper-show would not turn out a very satisfactory affair; for, though unlimited oatmeal has a fattening effect on beasts, the same substance, diluted into gruel, and that very sparingly administered, would hardly produce, in human beings, a degree of obesity that would fit them to enter the pens of Baker Street in competition with the annual cattle show. Perhaps the system would answer better for schoolmasters, who might form themselves into a Fat-boy Club, and exhibit annual specimens of the pinguidity attained by the scholars of their respective establishments. This would enable parents to select for their sons a school where the quality of the keep could be at once judged of by the plumpness of the boys exhibited. We merely throw out these hints as suggestions for improving the human race, by applying the principle of cattle shows, which are said to be extremely conducive to the amelioration of the breed of animals.—*Cruikshank's Table-Book.*

DESTRUCTION OF WASPS.

We observe, from the Scottish newspapers, that the Earl of Traquair has for several years past given a liberal reward to the children in the neighbourhood for the destruction of those troublesome insects during the months of April and May. At that period every wasp is in search of a location for a nest, and if unmolested, would become the parent of thousands. Owing, it may be supposed, to the limited fall of rain or snow last winter, these noxious creatures have been unusually numerous this season, as the following account will show:—The children, about fifty in number, were desired by his lordship to attend at Traquair House with their spoil every Saturday afternoon, where they were counted by the gardener, and each one paid so much per dozen. On the 26th April there were delivered 756 dozen, on the 3d May 114 dozen, on the 10th May 59½ dozen, and on the 17th May 643½ dozen—making in all the incredible number of 18,876 wasps' nests in the course of four weeks, and in one parish. It may be presumed, if each of these had been allowed to multiply, however favourable the season may prove, there would have been little fruit or honey left for miles around.

IRISH ANTIQUITIES.

'As I was passing a place called Lavey Strand, on the road from Cavan to Dublin,' says a correspondent of the Gardeners' Chronicle for June, 'I observed the bottom of an ancient canoe lying on the shore of the lake close to the road. I immediately went to examine it, and heard that it had been raised about a year ago from the bottom of the lake. When discovered, there was a gunwale above a foot in height along the sides, which, when I saw it, was almost entirely broken away. It was of very rude manufacture, hollowed out of the stem of an oak tree. The dimensions are gigantic. The bottom is four feet three inches across at one end, and about three feet at the other; the length is forty feet. The diameter of the tree could not possibly have been less than seven feet and a half at the root, and at least five and a half at the height of forty feet. This would allow only a very moderate bulge for the canoe. What could have been the use of so large a canoe, made with great toil, on so small a piece of water (not containing 200 acres), I cannot conjecture. There are two islands in the lake, which were found to be artificial when the proprietor was planting them about ten years ago. The earth is supported by a frame-work of enormous oak beams, mortised into each other, and this is supported on piles driven into the lake bottom. Some brass Celtic hatchets, ring money, and four brass swords, were found above the frame-work; and there is another canoe of smaller dimensions lying partly exposed and partly in the mud, near where the large one was found. The modern oak of this part of Ireland is not at all remarkable for its size.'

THE HAND.

[From 'Lays and Legends Illustrative of English Life,' by CAMILLA TOULMIN.]

WHAT is it, fashioned wondrously, that, twin-born with the brain,
Marks man from every meaner thing that bounds across the plain,
Or gambols in the mighty deep, or flonts in summer air?
What is the help meet for the mind, no lesser life may share?
It is the Hand, the Human Hand, interpreter of will—
Was ever servant yet so great, and so obedient still?
Of all Creation's mysteries with which the world is rife,
It seems a marvel to my soul but second unto life!
How weak a thing of flesh it is, yet think what it has done,
And ask from poor idolaters why it no worship won.
How could the lordly forest trees first bow their heads to man,
When with their ruined limbs he delved where veins of metal ran!
Ho! ho! 'tis found, and his to know the secrets of the forge,
And henceforth earth at his behest her riches must disgorge;
And now the Hand has servants fit, it guides as it is schooled,
To keep entire the perfect chain by which the world is ruled.
For when the molten iron flowed into the first rough mould,
The heritage of cunning craft was to the right hand sold;
And it hath been a careful lord, improving every right,
Until the mind is overawed by thinking of its might.
How slender and how fair a thing is woman's soft white hand,
Yet Saragozza's maid could seize the cannon's ready brand,
And martyred Joan (but not of war or carnage would I tell,
Unless the time were ripe, and mine the deep-toned honoured shell,
Whose notes should be the requiem of the gory monarch dread—
Whose laurels still, though steeped in tears, conceal his leprous head)!
The harp is roused by fingers fair, where clinging jewels glow
With light upon the awak'ning hand, like sunbeams upon snow;
Entranced music's soul returns once more to earth again,
A vassal to the hand that wills a gay or pensive strain.
Yet think that hand which never yet knew weariness or soil,
Whose fairness neither summer's sun nor winter's cold must spoil,
Which doth not know a harsher rule than leisure's chosen toil,
Is after all but fashioned like the trembling clammy thing
With which the faded sempstress pale, in youth's yet early spring,
Digs her own grave with needle small, through nature's drowsy night—
Oh, when will fortune—justice too—unbind their eyes to light?
How is it fashion's proud array, thus wove on death's own loom,
No'er changes by a demon spell to trappings of the tomb?
The painter bodies forth ideas, which on the canvas live,
The sculptor bids the shapeless stone a form of beauty give;
Wise Egypt's giant Pyramids by human hands were piled,
To wrestle still with conquering time, though centuries have smiled
With gentle touch to think how they sweep man from where he stands,
Yet linger o'er the records of his wonder-working hands!
It is a thought to lift the soul beyond its prison home,
To ponder o'er such things as these beneath the fretted dome
Of Gothic fane where erst have swept the serge-clad monkish train,
Who sought to win their paradise by self-inflicted pain—
Who never knew the worship true that life's pure joys impart—
Yet what a world and history is every human heart!
Alas! material monuments too oft, like Babel's tower,
But tell of human littleness, and not of human power!
More subtle—less self-evident than marvels such as these—
Those spirit-deeds that leave behind but dream-like legacies—
Nothing that sense can see or touch, but much that thought can keep,
As when the stately ship is taught its pathway o'er the deep
By one right hand that guides the helm, beneath the watchful crowd
Of ever-silent stars that pierce through nature's nightly shroud.
But thought is lost in mazy dreams of all the wondrous band
Of things and deeds that owe their birth unto the Human Hand!

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